

WHAT IS CLAIMED IS:

1. A semiconductor structure comprising: a substrate; a SiCAlN region formed over the substrate, and an active region formed over the SiCAlN region.
2. The semiconductor structure of claim 1 wherein the active region comprises a gallium nitride region.
3. The semiconductor structure of claim 2, wherein the active region comprises a compound of the group consisting of GaN, AlGaN, InGaN, AlInGaN, AlN and InN.
4. The semiconductor structure of claim 1, further comprising a crystalline oxide interface formed between the substrate and the SiCAlN region.
5. The semiconductor structure of claim 4 wherein the crystalline oxide interface comprises Si-Al-O-N.
6. The semiconductor structure of claim 1, wherein the substrate comprises a silicon substrate.
7. The semiconductor structure of claim 1, wherein the substrate comprises a silicon carbide substrate.
8. The semiconductor structure of claim 1, wherein the substrate comprises a silicon germanium substrate.
9. The semiconductor structure of claim 1, wherein the active region comprises a compound of the group consisting of BaTiO₃, KNbO₃ and KNbTaO₃.
10. The semiconductor structure of claim 1, wherein the active region comprises a compound of the group consisting of La_(x)Sr_(1-x)CoO₃ and LaSrTiO₃.
11. The semiconductor structure of claim 1, wherein the active region

comprises a compound of the group consisting of BaSrTiO₃, HfO₂, ZrO₂, and Al₂O₃.

12. The semiconductor structure of claim 1 wherein the active layer is formed by gas source molecular beam epitaxy.

13. The semiconductor structure of claim 1 wherein the active layer is formed by metal organic chemical vapor deposition.

14. The semiconductor structure of claim 1 wherein the active layer is formed by atomic layer epitaxy.

15. The semiconductor structure of claim 4 wherein the crystalline oxide interface is formed by gas source molecular beam epitaxy.

16. The semiconductor structure of claim 4 wherein the crystalline oxide interface is formed by metal organic chemical vapor deposition.

17. The semiconductor structure of claim 4 wherein the crystalline oxide interface is formed by atomic layer epitaxy.

18. The semiconductor structure of claim 1 wherein the structure is operable as a microelectronic device.

19. The semiconductor structure of claim 1 wherein the structure is operable as an optoelectronic device.

20. A semiconductor structure comprising: a substrate; a Si-Al-O-N region formed over the substrate, and an active region formed over the Si-Al-O-N region.

21. The semiconductor structure of claim 20 wherein the active region comprises a gallium nitride region.

22. The semiconductor structure of claim 20, wherein the active region comprises a compound of the group consisting of GaN, AlGa_xN_{1-x}, InGa_xN_{1-x}, AlInGa_xN_{1-x}, AlN

and InN.

23. The semiconductor structure of claim 20, further comprising a crystalline oxide interface formed between the substrate and the SiAlN region.

24. The semiconductor structure of claim 23 wherein the crystalline oxide interface comprises Si-Al-O-N.

25. The semiconductor structure of claim 20, wherein the substrate comprises a silicon substrate.

26. The semiconductor structure of claim 20, wherein the substrate comprises a silicon carbide substrate.

27. The semiconductor structure of claim 20, wherein the substrate comprises a silicon germanium substrate.

28. The semiconductor structure of claim 20, wherein the active region comprises a compound of the group consisting of BaTiO₃, KNbO₃ and K_{0.5}NbTaO₃.

29. The semiconductor structure of claim 20, wherein the active region comprises a compound of the group consisting of La_xSr_(1-x)CoO₃ and LaSrTiO₃.

30. The semiconductor structure of claim 20, wherein the active region comprises a compound of the group consisting of BaSrTiO₃, HfO₂, ZrO₂, and Al₂O₃.

31. The semiconductor structure of claim 20 wherein the active layer is formed by gas source molecular beam epitaxy.

32. The semiconductor structure of claim 20 wherein the active layer is formed by metal organic chemical vapor deposition.

33. The semiconductor structure of claim 20 wherein the active layer is formed by atomic layer epitaxy.

34. The semiconductor structure of claim 23 wherein the crystalline oxide interface is formed by gas source molecular beam epitaxy.

35. The semiconductor structure of claim 23 wherein the crystalline oxide interface is formed by metal organic chemical vapor deposition.

36. The semiconductor structure of claim 23 wherein the crystalline oxide interface is formed by atomic layer epitaxy.

37. The semiconductor structure of claim 20 wherein the structure is operable as a microelectronic device.

38. The semiconductor structure of claim 20 wherein the structure is operable as an optoelectronic device.